

TURBOCHARGER KIT

Installation Instructions for

2-0001 1980 BMW 320i

TURBO-SYSTEMS



CONGRATULATIONS:

You have just purchased a thoroughly engineered and tested turbocharger system. When installed following the enclosed instructions, your vehicle will have superb performance. Combined with proper driving habits, extensive testing has shown you may also achieve increased fuel economy.

The system is in compliance with Federal (EPA) and California (CARB) regulations, when installed according to our instructions. The enclosed CARB identification sticker must be attached prominently in your engine compartment. This sticker shows the exemption number granted by the CARB.

Please read completely through the instructions prior to starting the installation. By understanding how the whole assembly fits together, you will undoubtedly save yourself time and possible costly rework. You may wish to consult a factory service manual if you encounter terminology or procedures which are not clear.

The final tune up instructions in the enclosed manual advise you to use the highest octane unleaded fuel available. If your vehicle presently has low octane unleaded fuel in it's tank, either drive the vehicle until the fuel is used, or drain and refill with premium prior to running the vehicle under boost. This system was designed and tested to provide thousands of miles of carefree, trouble free driving. A few simple precautions during the installation can insure your future driving pleasure.

For sustained high speed/high performance European Autobahn style driving you may wish to connect the line from the throttle valve to the distributor vacuum advance and change the exhaust system to a $2\frac{1}{2}$ " pipe and a turbo muffler.

NOTE: With this change the system does not comply with EPA and CARB regulations.

2-0001 BMW 320i (1980)

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	1	2-1001	Century exhaust manifold
2	1	2-2001	Century intake pipe
3	1	2-3003	Century discharge pipe
4	1	2-4003	Century exhaust pipe
5	1	2-4008	Century wastegate silencer
6	1	5001	2 $\frac{1}{4}$ " silicone hose (2" long)
7	1	5004	3" silicone hose (1-3/4" long)
8	1	5004	3" silicone hose (2 $\frac{1}{4}$ " long)
9	1	5014	$\frac{1}{4}$ " vacuum hose (42" long)
10	1	5017	5/8" vent hose (7 $\frac{1}{2}$ " long)
11	1	5017	5/8" vent hose (8" long)
12	1	5022	3/16" vacuum plug
13	1	5027	5/8" oil hose (3 $\frac{1}{4}$ " long)
14	1	6022	-4 hose 18 $\frac{1}{2}$ " long W/2 straight ends
15	1	6023	-4 hose 46" long s/45° & straight end
16	1	7003	5/8" slip on 45° oil drain
17	2	7024	1/8p to -4 AN straight
18	2	7026	1/8p to -4 AN 90°
19	1	7047	3/8" pipe to $\frac{1}{2}$ " hose 90°
20	1	7065	1/8 pipe to $\frac{1}{4}$ " hose 90°
21	1	7072	3/8" pipe to 5/8" hose
22	1	7049	$\frac{1}{2}$ p to 5/8" hose end 45°
23	2	8010	#10 hose clamps
24	2	8032	#32 hose clamps
25	4	8044	#44 hose clamps
26	2	8400	Tie wraps
27	2	9002	$\frac{1}{4}$ " - 20 X 3/4" bolts
28	2	9026	$\frac{1}{4}$ -20 X $\frac{1}{2}$ " Allen head bolts
29	4	9027	$\frac{1}{2}$ -20 X 3/4" Allen head bolts
30	2	9203	3/8-16 X 1" hex head bolts
31	2	9251	3/8" lock washers
32	2	9261	3/8" -16 nuts
33	3	9273	3/8-16 X 3/4" header bolts
34	7	9274	3/8-16 X 1" header bolts
35	1	10000	Oil drain gasket
36	1	2-13024	Intake plenum
37	1	14020	Wastegate S/N _____
38	1	2-15000-4	Throttle Cable
39	1	19102	$\frac{1}{2}$ " plastic coupling
40	1	2-20000	*pressure enrichment assembly
41	1	2-22041	Dipstick bracket
42	1	2-22042	Throttle cable bracket
43	1	23024	2 $\frac{1}{2}$ " 3 bolt triangle flange
44	1	2-25001	Turbo S/N _____
45	1	2-28001	Instruction manual

Packed by employee # _____

BMW 320i 1980 and Later

Equipment Required

Jack
Jack Stands (2)
Basic American Hand Tools
Basic Metric Hand Tools
Drill Motor
21/64" (.328") drill Bit
11/16" Drill bit or Hole saw.
1/8 NPT Tap
1/2 NPT Tap
13mm 6 point Universal Socket
Anti-sieze Compound
Teflon Tape or Pipe Sealant
1 Set Exhaust Port Gaskets (BMW)

The use of aircraft quality lines are apparent in your new Century turbo kit. Aircraft (braided steel) lines seal to each other with a tapered interference fit and need only to be properly tightened to seal. However the use of NPT (National Pipe Thread) fittings are also apparent in the kit. When installing any NPT fittings we recommend use of a good pipe thread sealant preferably teflon tape on threads to assure a proper seal.

Anti-sieze is a compound that prevents seizing, galling, and pitting of metal threads. Anti sieze is to be used on all nuts and bolts in conjunction with the exhaust system; manifold, turbine housing, exhaust outer ring, wastegate, etcetera, for ease of disassembly.

1. Jack up car and support with jack stands. Disconnect negative battery cable from battery.
2. Remove air cleaner assembly.

PREPARATION:

1. Remove exhaust manifolds, and catalytic converter exhaust pipe. Cut catalytic converter exhaust pipe as indicated in drawing on page #8. Set aside for reinstallation later.
2. Remove the sheet metal heat shielding from above the passengers side steering arm. Reinstalltion of this shield is optional.
3. Disconnect the wire leading to the oxygen sensor in the exhaust manifold at it's connector on the inner fender panel. Pull the wire from the clips holding it and remove the exhaust manifold.
4. Unscrew oxygen sensor from BMW exhaust manifold. Figure #1.
5. Remove the auxilliary air valve from the head; Note that it's plug is black.
6. Remove the cold start injection nozzle from the intake plenum; note that it's plug is blue.

7. Remove the brown plug from the water temperature sensor, and the brown/white wire from the sensor just inboard of it.
8. Remove the plug from the frequency valve inboard of the air sensor body; note that it's plug is white.
9. Remove the two wires from the temperature sensor screwed into the boss on the front engine lifting eye.
10. Remove all vacuum hoses from the plenum and throttle body, and tag them for reinstallation later on.
11. There are two small water hoses connected to the throttle body at the forward top corner of the throttle body. Leave these connected until the plenum is free to move out of the way.
12. Loosen the two nuts that secure the throttle cable to the throttle cable bracket. Remove the two nuts securing top of throttle cable bracket and one holding the bottom. Remove throttle cable bracket with full throttle switch attached. Figure #2. Note: Wiring to throttle body. Note how cable end is secured for ease of reassembly. Set cable aside until instructions call for removal.
13. Remove the brace between number 3 and number 4 intake runners to clear wiring loom upon plenum removal. Injector lines need to be unscrewed from injectors to allow the removal and replacement of plenums.
14. Remove the nuts securing the intake plenum to the head. Loosen the hose clamps on rubber bonnet connecting the air sensor and the throttle body. Lift the plenum and remove the four nuts holding the throttle body to the plenum. Remove plenum.
15. Remove the bolt and nut securing the dipstick tube holding clamp to the bracket bolted to the intake plenum. Save this bolt and nut to attach the Century dipstick tube bracket to the clamp. Remove the bolt on the air sensor body just outboard of the space between the rubber boot and the fuel distributor, and attach the Century dipstick tube bracket (short end) at this point. Using the bolt and nut previously removed, attach the dipstick tube holding clamp to the Century bracket.

INSTALLATION:

1. Oil drain: On the engine block; $1\frac{1}{4}$ " up from the oil pan rail, and 2" to the rear of the trailing edge of the aluminum motor mount casting drill an $11/16$ " hole. Tap this hole with a $\frac{1}{2}$ NPT tap. While drilling and tapping, coat the drill and tap with some white grease to prevent metal chips from entering the oil pan. Install the $1/2$ " pipe to $5/8$ " hose 45° fitting supplied, into this hole. The open end of this fitting should point to the rear and up about 30° Figure #3.
2. Oil Supply: Remove oil filter and oil filter adaptor. There are three bolts securing the oil filter adaptor to the block, the top bolt is rather difficult to reach, but can be removed with a $3/8$ " drive 6 point universal socket. If you can't get the third bolt loose, loosen the alternator adjusting bolt, remove the belt, remove

2. (cont.)

the adjusting bolt, and allow the alternator to rest on the body. When the oil filter adaptor is reinstalled, move the alternator back to it's original location.

3. Once removed, notice a dimpled spot between the two longer bolt bosses. Drill through the dimple with a 21/64" drill bit and tap this hole with a 1/8" NPT tap. Install one of the 1/8" pipe to -4 AN straight fittings supplied. Reinstall the filter adaptor and filter, but not the air cleaner.

4. Replace the air filter assembly after the oil supply hose has been installed.

5. Install B.A.E. exhaust manifold, using new exhaust gaskets. Tighten manifold nuts securely. Note: 3 bolt flange points down.

6. Locate wastegate and wastegate silencer. Bolt silencer to wastegate using two 3/8-16 X 1-3/4" bolts, nuts and lock washers. Silencer will point away from aluminum cover of wastegate. Note: No gasket is used between wastegate and manifold or wastegate and silencer.

7. Bolt wastegate assembly to manifold (silencer points down) using two 3/8-16 X 1" header bolts. Install 1/8 NPT to -4 AN 90° fitting in boss on side of wastegate, tighten so fitting points up.

8. Install oxygen sensor to tapped boss on the top of B.A.E. exhaust manifold.

9. Turbo Preparation: Remove the two plastic plugs from the bearing housing of the turbo. Into the 1/8" pipe threaded hole, install one of the 1/8" pipe to -4 AN straight fitting supplied. Into the opposite side of the bearing housing, install the B.A.E. oil drain fitting (hose end pointing toward compressor - aluminum side) using the supplied gasket and two 3/8-16 X 1" header bolts. Loosen the V band clamp nut until you can rotate the two halves of the turbo independently of one another. Locate the oil supply hose (the long one) and install the straight hose end onto the oil supply fitting in the turbo.

10. Install the turbo onto the exhaust manifold, using the three 3/8-16 X 3/4" header bolts supplied. Note: There is no gasket used here.

11. Locate the 3 $\frac{1}{4}$ " length of 5/8" oil drain hose supplied and the two #10 hose clamps. Slip the hose, and both the clamps over the fitting in the block.

12. Rotate the compressor half of the turbo into the open end of the hose. If you have positioned the fitting correctly, the hose will be a straight shot from the turbo oil drain fitting to the fitting in the block. Leave loose for positioning.

13. Install the exhaust out pipe, using the triangular 3 bolt flange (tapered I.D. toward the turbo) and three 3/8-16 X 1" header bolts supplied. Position the exhaust pipe so that it points directly where the stock pipe was originally. Reinstall catalytic converter

13. (cont.)

13. (cont.)
14. Remove the two water hoses from the throttle body. Install throttle body and gasket to Century intake plenum using the four $\frac{1}{4}$ -20 X 3/4" bolts supplied. Throttle body linkage will point up.
15. Replace water lines on throttle body before plenum is installed.
16. Using the original gaskets and hardware, install the Century plenum onto the head. Note: Replace gaskets if needed.
17. Install 3/8 NPT to 5/8" hose fitting in front side of plenum inlet near throttle body. This will be used for auxilliary air valve. On under side install 3/8 NPT to 1/2" hose 90° fitting. This fitting will be used for the power brake vacuum source.
18. Install the cold start injector nozzle onto the front end of the plenum, and secure it with the two $\frac{1}{4}$ -20 X $\frac{1}{2}$ " allen head bolts supplied. It may be necessary to rotate the fuel line to the cold start nozzle, easily done by loosening the banjo bolt, rotating the banjo, and retightening the bolt.
19. Reinstall all wiring except white plug for frequency valve.
20. Locate the two pieces of 5/8" vent hose supplied. Clamp the 8" length to the bottom of the auxilliary air valve.
21. Install the stock bonnet onto the air sensor, with the 3" opening just outside the edge of the plenum.
22. Install the auxilliary air valve onto the head. The top existing BMW hose goes onto the fitting on the front side of the plenum. Clamp in place.
23. The bottom hose goes to the plastic tee in the side of the air sensor bonnet. The 7 $\frac{1}{2}$ " length of 5/8" vent hose goes on the other end of the bonnet tee, and up to the tee connected to the valve cover breather hose.
24. Cap the small side of this tee with the 3/16" vacuum cap supplied.
25. Connect the power brake vacuum hose to the fitting installed on the underside of the plenum. Clamp in place.
26. Locate the 1/8" pipe to -4 AN 90° fitting supplied. Install it on the threaded hole in the extreme top rear of the plenum.
27. On the bottom rear of the plenum install 1/8 NPT to $\frac{1}{4}$ " hose 90° fitting.
28. Position fuel enrichment switches on firewall near engine. Route vacuum hose from fitting at bottom rear of plenum to fitting on enrichment switches.

29. Connect the two wires that originally went to the full throttle switch on the plenum support bracket to the Century metal fuel enrichment switch. See figure #6.
30. Wiring from plastic pressure switch is to be routed under plenum toward air sensor. Cut vinyl sheathing from around wires leading into white frequency valve plug. You will find one black/yellow striped wire and one blue/black striped wire. Cut the blue/black striped wire. Connect the ends of this wire to plastic pressure switch as indicated in figure #5. Reconnect the plug to the frequency valve.
31. Route the oil supply hose around in front of the engine, cable tie it to the front engine lifting eye, and attach it to the oil supply fitting you installed in the oil filter adaptor. Important Note: If you have to rotate the 45° hose end make sure you tighten it. Turning the hose end counterclockwise may cause the hose end to leak.
32. Connect the wastegate supply hose between the fitting on the wastegate, and the 90° fitting on the plenum. Note: Be sure to remove the plastic plug on the top of the wastegate. This is a vent and must be left open.
33. Plug bottom vacuum fitting on throttle body. See figure #4.
34. Below the battery you will find a charcoal canister. The larger of the two hoses should be removed, and replaced with the 42" length of vacuum hose supplied. Connect this hose to the throttle body. Route it around the rear. Refer to figure 4 for vacuum hose connections.
35. Remove the panel under the dashboard on the drivers side. Locate the throttle cable, disconnect the cable. Using a pair of pliers pull the cable out from inside the engine compartment.
36. Replace the cable just the way it came out, with the Century cable. Attach the cable to the cable bracket on the plenum and the plastic connector on the throttle body arm. Check for full throttle. If full throttle is not achieved, adjust the gas pedal stop under the pedal, so that when contact is made, you've just gotten to full throttle. Also check to see that there is no cable to linkage interference. If there is the linkage may be bent slightly.
37. Replace the under dash panel.
38. Install Century discharge pipe between turbo discharge and throttle body using 2" X 2 $\frac{1}{4}$ " I.D. silicone hose and two #32 hose clamps on turbo end. Use 1-3/4" X 3" I.D. silicone hose and two #44 hose clamps on throttle body end. Position inlet pipe and tighten hose clamps. Install intake pipe from air sensor to front of turbo using stock rubber bonnett on air sensor and 2 $\frac{1}{4}$ " X 3" I.D. silicone hose on turbo and two #44 hose clamps. Position inlet pipe and tighten all hose clamps. Inlet pipe should run in front of cylinder head.
39. On some cars, it may be necessary to push the air conditioning hoses out of the way of the intake pipe. Make sure nothing rubs.

40. Tighten the V band clamp on the turbo (15 to 20 inch pounds), or until 3/8" of threads protrude from the nut.
41. Tighten oil drain hose clamps.
42. Install the air cleaner into it's original location.

FINALIZATION:

1. Check to make sure all wires have been connected, and no hoses left open.
2. Change you oil and filter at this point.

I. Starting the engine

1. Start the engine but do not race the engine. Allow the engine to idle for ten minutes, observe oil pressure and coolant temperatures. Shut the engine off and observe all lines to insure you have no oil, fuel or coolant leaks.
2. Restart the engine and check ignition timing following the factory service manual procedures.

II. Normal Use of the Turbocharger

1. Test the system by accelerating in slow steps. Do not accelerate the vehicle to the maximum the first time. Use common sense.
2. Run only top grade unleaded premium in your Century turbo powered car.
3. The wastegate is adjustable between four and six pounds of boost, by turning the allen screw in the wastegate you increase the boost. See supplementary wastegate instructions. Century recommends you set the wastegate at five pounds of boost. Exceeding five psi could lead to engine damage.
4. If at any time detonation or preignition is heard, contact Century for technical assistance. Detonation will cause severe engine damage.
5. Century recommends the installation of a high quality boost gauge for hard driving or wastegate adjusting. You may purchase the gauge from Century.
6. Allow the engine to idle for one minute after being in boost conditions when you reach your destination. This allows the turbocharger to cool.

III. Maintenance

1. Every 2,000 miles change the oil and filter in your engine.
2. Periodically check all bolts, hoses and clamps for tightness.
3. Follow manufacturers maintenance schedule for all other maintenance recommendations.

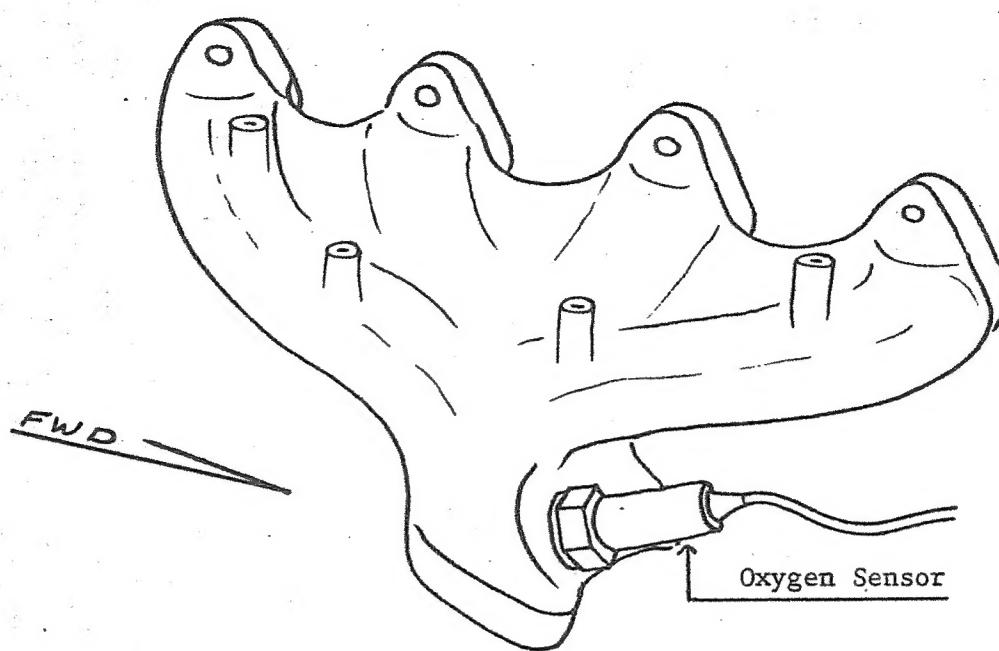
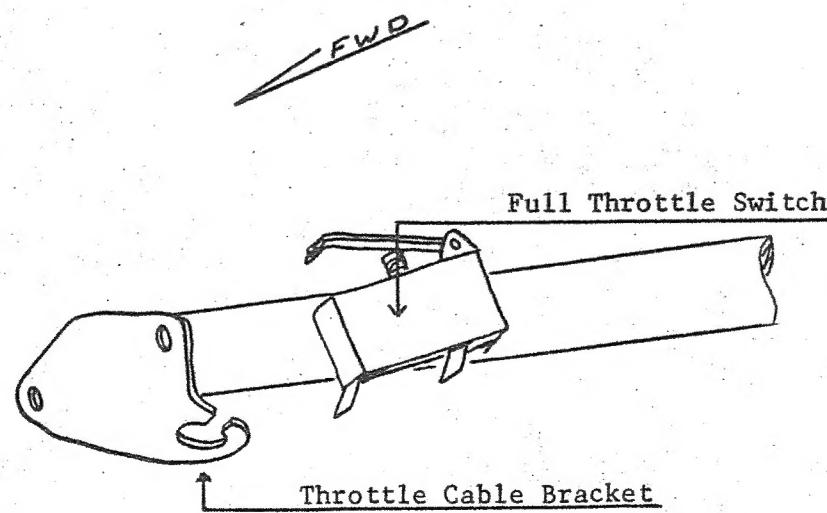


Figure 1



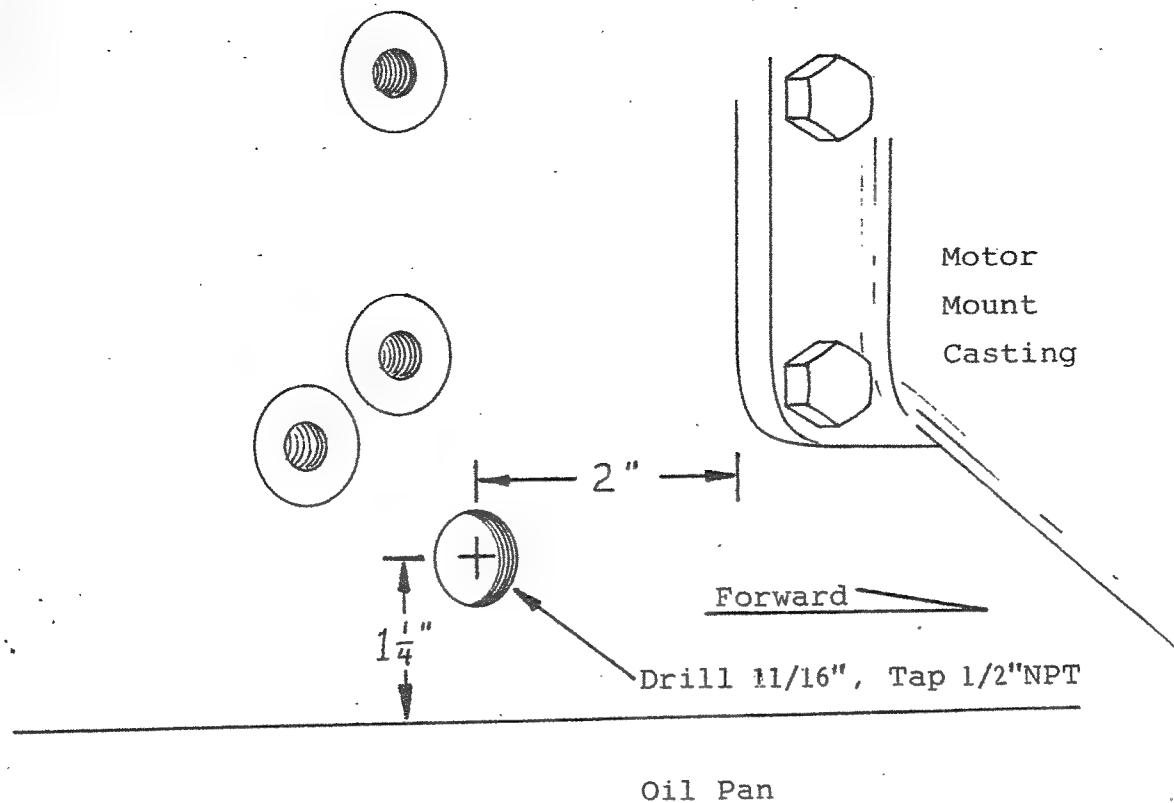
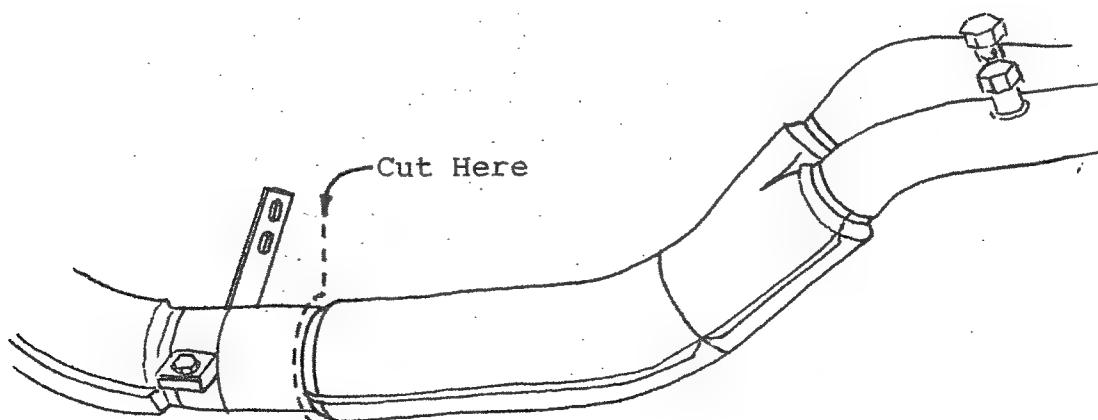
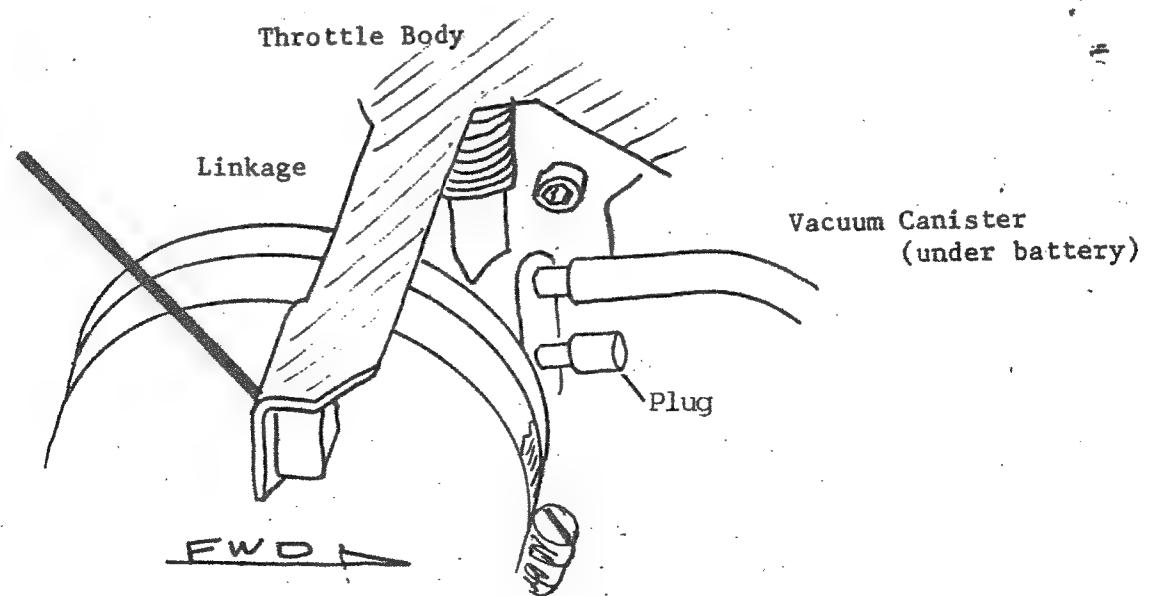
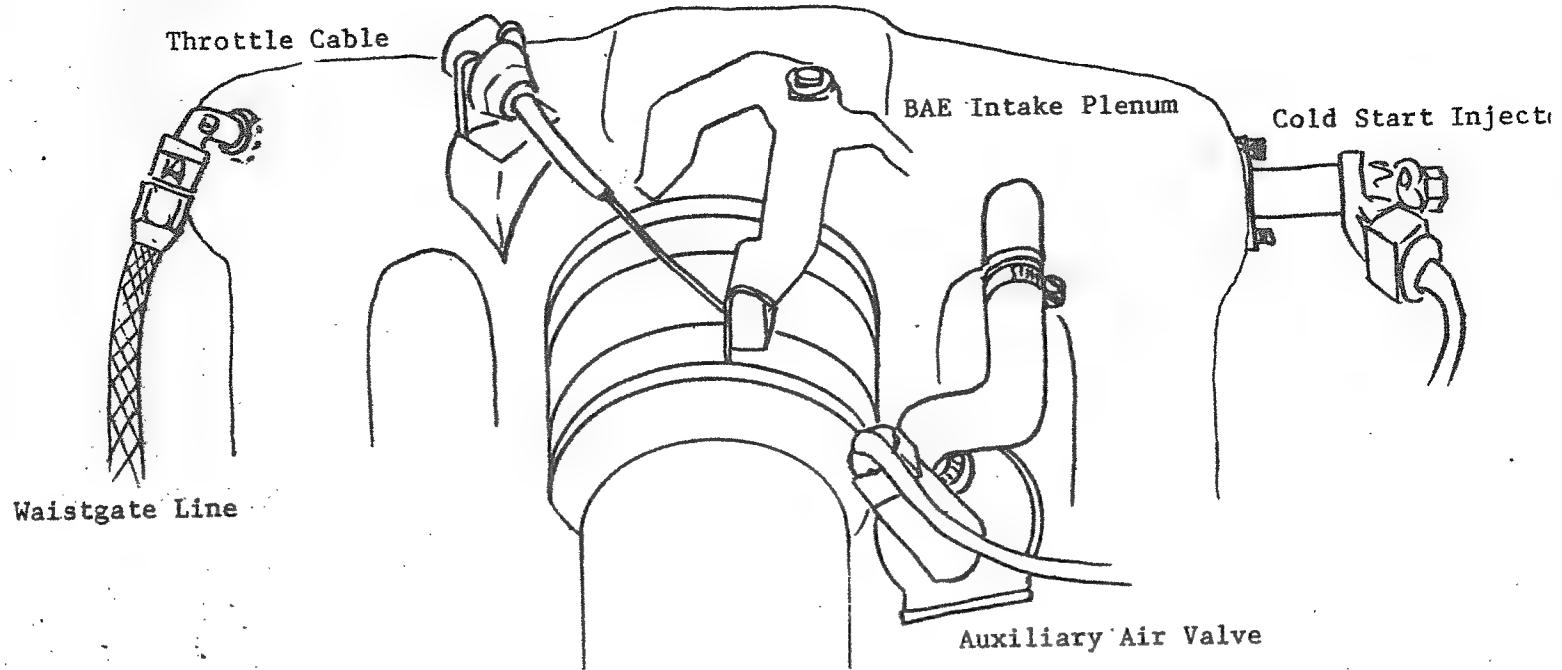


Figure 3





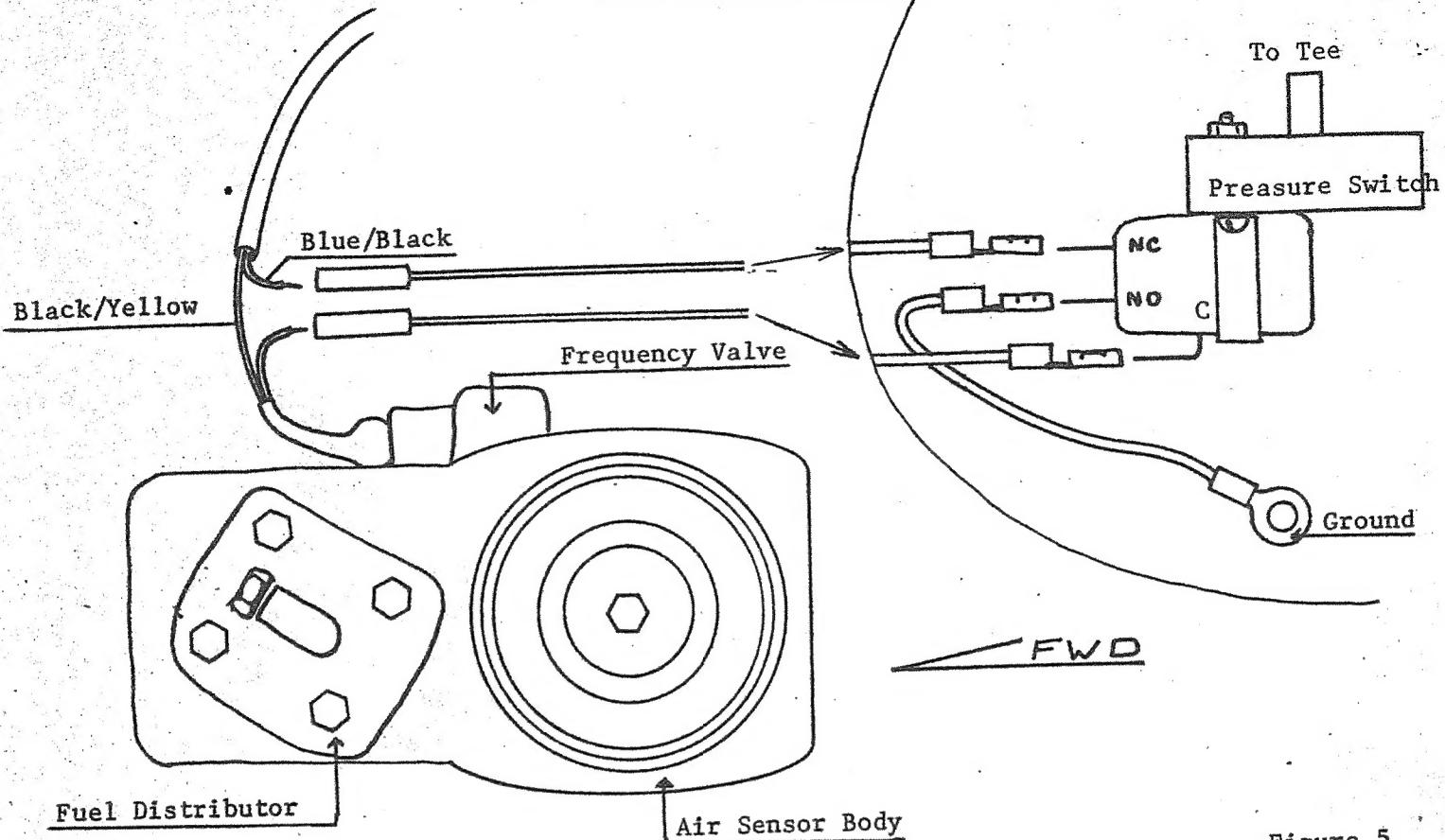


Figure 5

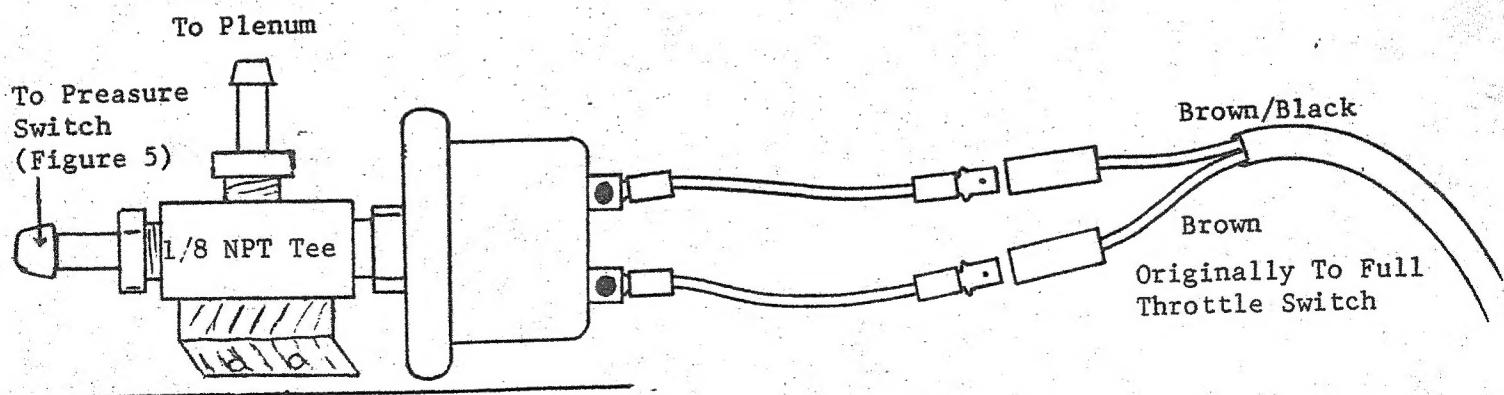


Figure 6

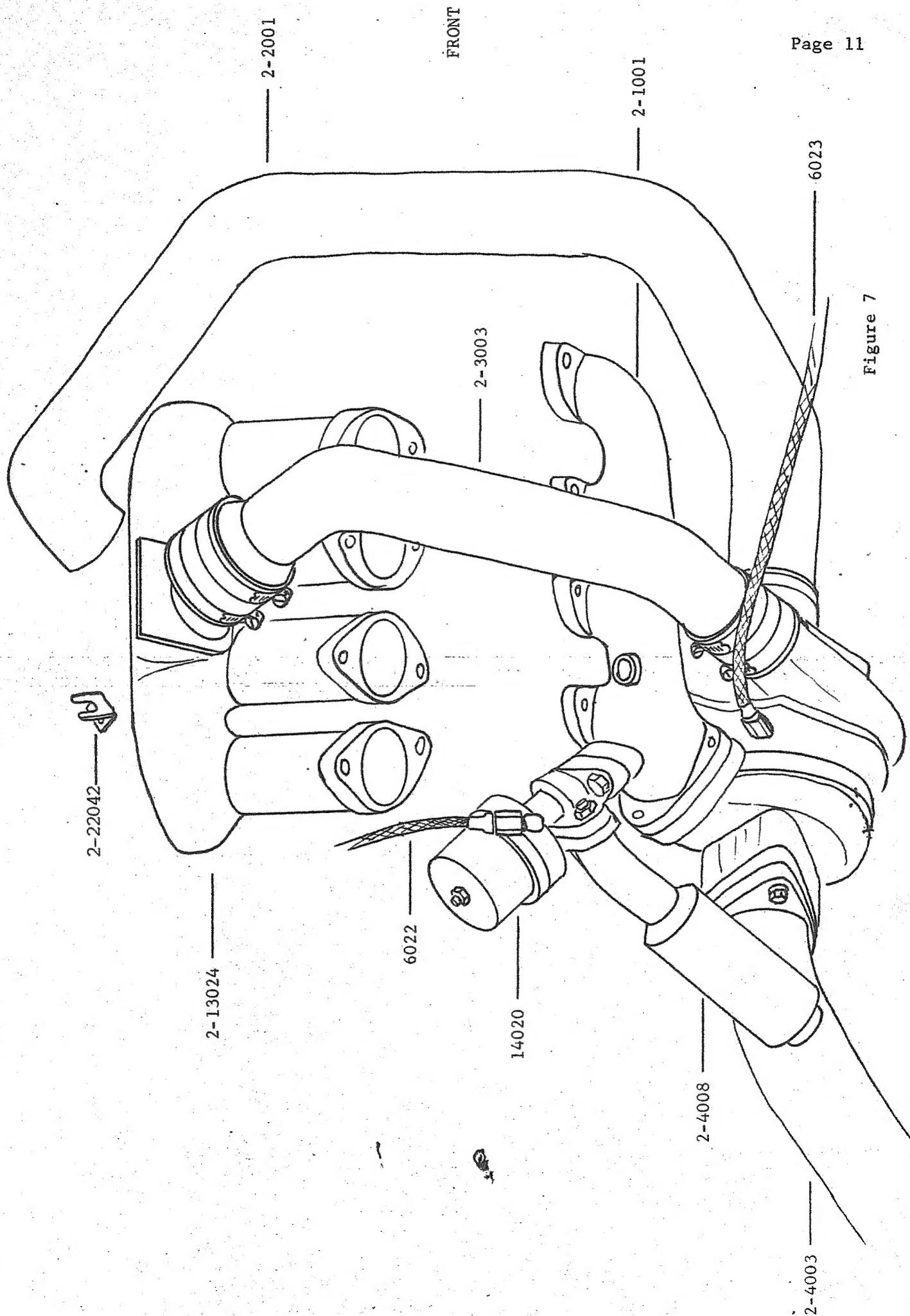


Figure 7

SPECIAL INSTRUCTIONS...

As with all turbocharged engines, when shutting off the engine after any hard running (freeway driving or "on boost" performance, etc.) let the motor idle for one to three minutes before turning it off.

This allows everything to cool down before the oil which lubricated and cools the turbo is shut off.

Failure to do so will shorten the turbo life.

Addendum:

1. The enclosed plug wire boot must be installed on #4 plug wire.
2. Included in this kit are a reducer and muffler clamp. The reducer will be welded on the end of the Century exhaust out pipe. The clamp is used to clamp the reducer to the catalytic converter exhaust pipe. With Century exhaust out and BMW catalytic converter exhaust pipe installed, position the adaptor and weld in place on Century exhaust out pipe. Do not clamp in place until #3 below is completed.
3. One of the exhaust sampling ports must be cut off of the BMW catalytic converter exhaust pipe. It will be welded on the side of the Century exhaust out pipe near the reducer. (See #2 above). This fitting is stainless steel and must be welded with a heliarc (T.I.G.) welder. Position the sampling port for easy access from the side of the car.
4. The metal pressure switch shown in figure #6 is replaced with a plastic switch as in figure #5. Hook up is to the N.O. and "C" terminals.